



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/550,860

07/10/2006

Michele Muccini

MOD3216P0381US

3415

32116

7590

07/13/2009

WOOD, PHILLIPS, KATZ, CLARK & MORTIMER  
500 W. MADISON STREET  
SUITE 3800  
CHICAGO, IL 60661

EXAMINER

SUCH, MATTHEW W

ART UNIT

PAPER NUMBER

2891

MAIL DATE

DELIVERY MODE

07/13/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                       |  |
|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/550,860 | <b>Applicant(s)</b><br>MUCCINI ET AL. |  |
|                              | <b>Examiner</b><br>MATTHEW W. SUCH   | <b>Art Unit</b><br>2891               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/26/05 &amp; 4/7/09</u> .                                    | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Priority*

1. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 60/458,847, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application as shown.

Regarding claim 3, the Application No. 60/458,847 does not provide support for the dielectric layer comprising alumina. As such, claim 3 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 4, the Application No. 60/458,847 does not provide support for the electron and hole electrodes having at least one different material. As such, claim 4 is not accorded benefit of the filing date of the Application No. 60/458,847.

Art Unit: 2891

Regarding claim 5, the Application No. 60/458,847 does not provide support for the electron electrode comprising In or Perovskite Manganites ( $\text{Re}_{1-x}\text{A}_x\text{MnO}_3$ ). As such, claim 5 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 6, the Application No. 60/458,847 does not provide support for the hole electrode comprising any of indium tin oxide, Cr, Cu, Fe, Ag, poly(3,4-ethylenedioxythiophene) combined with poly(styrene sulfonate) or Perovskite Manganites ( $\text{Re}_{1-x}\text{A}_x\text{MnO}_3$ ). As such, claim 6 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 8, the Application No. 60/458,847 does not provide support for the channel comprising perylenes, terthiophene, quinquethiophene or bora-diazaindacene. As such, claim 8 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 9, the Application No. 60/458,847 does not provide support for the channel comprising an amorphous semiconductor material. As such, claim 9 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claims 10 and 11, the Application No. 60/458,847 does not provide support for the channel comprising a poly-crystalline material and details claimed therein. As such, claims 10 and 11 are not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 12, the Application No. 60/458,847 does not provide support for the hole electrode and electron electrode are spaced apart at 5 nm to 5 microns. As such, claim 12 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claims 13 and 14, the Application No. 60/458,847 does not provide support for the electron electrode and hole electrode having digitated structure comprises a regular repetition

Art Unit: 2891

of a basic finger structure and details claimed therein. As such, claims 13 and 14 are not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 21, the Application No. 60/458,847 does not provide support for a flexible or rigid substrate. As such, claim 21 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claims 22 and 23, the Application No. 60/458,847 does not provide support for the channel being formed by sublimation and details claimed therein. As such, claims 22 and 23 are not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 24, the Application No. 60/458,847 does not provide support for the channel being formed by solution processing of one or more soluble and/or polymeric materials. As such, claim 24 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 25, the Application No. 60/458,847 does not provide support for the channel being formed by a combination of sublimation and solution processing. As such, claim 25 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 26, the Application No. 60/458,847 does not provide support for the channel being formed by thermal, chemical or physical treatment of pre-deposited organic semiconductors. As such, claim 26 is not accorded benefit of the filing date of the Application No. 60/458,847.

Regarding claim 27, the Application No. 60/458,847 does not provide support for the device being manufactured by printing techniques. As such, claim 27 is not accorded benefit of the filing date of the Application No. 60/458,847.

***Information Disclosure Statement***

2. The information disclosure statement filed 26 September 2005 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance of the document FR 2,758,431 A, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

3. The information disclosure statement (IDS) submitted on 7 April 2009 is being considered by the examiner.

***Drawings***

4. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

5. The disclosure is objected to because of the following informalities:

Art Unit: 2891

- i. The word "polymethylmetacrylate" on Page 3, Line 19 and Page 13, Line 26 should each read "polymethylmethacrylate";
- ii. There is a period missing at the end of the sentence on Page 3, Line 19;
- iii. There is a period missing at the end of the sentence on Page 4, Line 7;
- iv. There is a period missing at the end of the sentence on Page 4, Line 9;
- v. The word "then" on Page 4, Line 12 and Page 5, Line 2 should each read "than";
- vi. There is a period missing at the end of the sentence on Page 5, Line 21;
- vii. The word "oligothiophens" on Page 11, Line 26 should read "oligothiophenes";
- viii. The word "aluminium" on Page 13, Line 25 should read "aluminum".

Appropriate correction is required.

### ***Claim Objections***

6. Claim 3 is objected to because of the following informalities: "polymethylmetacrylate" in Line 3 should read "polymethylmethacrylate" and a period is missing at the end of the claim.

Appropriate correction is required.

7. Claim 9 is objected to because of the following informalities: a period is missing at the end of the claim. Appropriate correction is required.

Art Unit: 2891

8. Claim 10 is objected to because of the following informalities: a period is missing at the end of the claim. Appropriate correction is required.

9. Claim 11 is objected to because of the following informalities: "then" in Line 3 should read "than". Appropriate correction is required.

10. Claim 17 is objected to because of the following informalities: "then" in Line 2 should read "than". Appropriate correction is required.

11. Claim 25 is objected to because of the following informalities: a period is missing at the end of the claim. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims each recite Perovskite Manganites ( $\text{Re}_{1-x}\text{A}_x\text{MnO}_3$ ). However, the use of the formula  $\text{Re}_{1-x}\text{A}_x\text{MnO}_3$  enclosed in parenthesis renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Specifically, it is unclear whether or not Perovskite



Art Unit: 2891

Manganites must be of the formula  $\text{Re}_{1-x}\text{A}_x\text{MnO}_3$ , or whether they can be of another formula, such as  $\text{Re}_{1-x}\text{MnO}_3$  or  $\text{A}_x\text{MnO}_3$  or some other formula. Furthermore, it is unclear what element is "Re" and "A" since neither are recognized elements of the periodic table and the specification provides no guidance as to what these symbols are. Additionally, the formula  $\text{Re}_{1-x}\text{A}_x\text{MnO}_3$  fails to identify any value of x and the specification provides no guidance on what x can be.

***Claim Rejections - 35 USC § 102***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

15. Claims 1-3, 5, 7-8 and 22-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Schön (Science, Vol. 290; supplied with IDS submitted 7 April 2009).

a. Regarding claim 1, Schön teaches an electroluminescence generating device comprising a channel (see regions of " $\alpha$ -6T Single Crystal" labeled "Electrons", Recombination Zone", "Holes" in Fig. 3) of organic semiconductor (see " $\alpha$ -6T Single Crystal" in Fig. 3), the channel being able to carry both types of charge carriers, which are electrons and holes (see "Electrons" and "Holes" in Fig. 3). An electron electrode

Art Unit: 2891

(see "Source" in Fig. 3) is in contact with the channel and positioned on top of a first side of the channel layer or within the channel layer (Fig. 3) and is able to inject electrons into the channel layer. A hole electrode (see "Drain" in Fig. 3) is spaced apart from the electron electrode and is in contact with the channel and positioned on top of the first side or within the channel layer (see Fig. 3) and is able to inject holes into the channel layer. A control electrode (see "Gate" in Fig. 3) is positioned on the first side of the channel. Regarding the recitation of "whereby light emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode", the manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) See MPEP § 2114. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. The recitation of "whereby light emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode

and said hole electrode" does not distinguish the present invention over the prior art of Schön who teaches the structure as claimed and also teaches the very functionality set forth by the claim (see Page 964, Right Col., Lines 1-7).

b. Regarding claim 2, Schön teaches that a dielectric layer (gate oxide in caption for Fig. 3) is between the channel and the control electrode.

c. Regarding claim 3, Schön teaches that the dielectric layer is alumina (Page 964, Left Col., Line 18).

d. In so far as claim 5 is definite, Schön teaches that the electron electrode comprises Al (Page 964, Left Col., Line 16).

e. Regarding claims 7 and 8, Schön teaches that the channel comprises a small molecule material of sexithiophene (see " $\alpha$ -6T" in Fig. 3 and Page 963, Right Col., Line 13 and Page 964, Left Col., Lines 5-6).

f. Regarding claims 22-27, the entirety of the language of these claims are directed towards the process of making the electroluminescence generating device of claim 1. It is well settled that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In*

Art Unit: 2891

*re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. The above case law further makes clear that applicant has the burden of showing that the method language necessarily produces a structural difference. As such, the language claims 22-27 only requires the electroluminescence generating device of claim 1, which does not distinguish the invention from Schön, who teaches the structure as claimed.

g. Regarding claim 28, Schön teaches a method for generating electroluminescence using the device of claim 1 by recombination of electrons and hole injected into the channel from the electron electrode and the hole electrode (Fig. 3 and associated text).

16. Claims 1-9 and 15-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Heeger ('583).

h. Regarding claim 1, Heeger teaches an electroluminescence generating device comprising a channel (see recombination zone in "polymer" and "polymer LEC" in Figs. 1-2; Col. 2, Lines 42-45) of organic semiconductor (see "polymer" and "polymer LEC"

Art Unit: 2891

in Figs. 1-2), the channel being able to carry both types of charge carriers, which are electrons and holes (see Figs. 1-2; Col. 7, Lines 30-32). An electron electrode (see "source" in Figs. 1-2) is in contact with the channel and positioned on top of a first side of the channel layer (see Figs. 1-2) and is able to inject electrons into the channel layer. A hole electrode (see "drain" in Figs. 1-2) is spaced apart from the electron electrode and is in contact with the channel and positioned on top of the first side within the channel layer (see Figs. 1-2) and is able to inject holes into the channel layer. A control electrode (see "gate" in Figs. 1-2) is positioned on a second side of the channel. Regarding the recitation of "whereby light emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode", the manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) See MPEP § 2114. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. The recitation of "whereby light

Art Unit: 2891

emission of side electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode" does not distinguish the present invention over the prior art of Heeger who teaches the structure as claimed and also teaches the very functionality set forth by the claim (see Figs. 1-2 and associated text).

i. Regarding claim 2, Heeger teaches that a dielectric layer (see "SiO<sub>2</sub>" in Figs. 1-2) is between the channel and the control electrode.

j. Regarding claim 3, Heeger teaches that the dielectric layer is silicon oxide (Col. 8, Line 38), alumina (Col. 8, Line 40), or polyimide (Col. 8, Lines 42-43).

k. Regarding claims 4 and in so far as claims 5-6 are definite, Heeger teaches that the electron electrode and hole electrode can be different materials, such as Ca for the electron electrode (Col. 6, Lines 13-14 and Col. 9, Lines 1-3) and Au for the hole electrode (Col. 6, Lines 11-12; Col. 8, Lines 66-67).

l. Regarding claim 7, Heeger teaches that the channel comprises a small molecule material (Col. 8, Lines 17-19) or a polymer (Col. 8, Lines 2-9, at least)

Art Unit: 2891

- m. Regarding claim 8, Heeger teaches that the channel comprises a polyphenylenevinylene (see PPV compounds disclosed in Col. 4, Lines 47-48; Col. 5, Line 12; Col. 7, Lines 9-10; Col. 8, Lines 8-10, for example).
- n. Regarding claim 9, Heeger teaches that the channel comprises amorphous semiconductor material (Col. 8, Lines 17-19).
- o. Regarding claim 15, Heeger teaches that the control electrode is an injection control electrode, since it is a gate electrode, and is positioned on the second side of the channel. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of "whereby the application of an electrical potential difference between said control electrode and said hole electrode or electron electrode, facilitates the injection of charge carriers into said channel" does not distinguish the present invention over the prior art of Heeger who teaches the structure as claimed, as well as such functionality.

Art Unit: 2891

p. Regarding claim 16, Heeger teaches that the control electrode is an injection control electrode, since it is a gate electrode, and is positioned on the second side of the channel. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of "whereby the application of an electrical potential difference between said control electrode and said electron and/or hole electrode allows to control the current of at least one type of charge carriers" does not distinguish the present invention over the prior art of Heeger who teaches the structure as claimed, as well as such functionality.

q. Regarding claim 17, Heeger teaches that the channel comprises more than one sublayer (including layer of "polymer", "polymer LEC", "n" and "p" in Fig. 2).

r. Regarding claim 18, Heeger teaches that the channel comprises an electron injection type sublayer (see Element of "n" in Fig. 2), able to facilitate injection of electrons, a hole injection type sublayer (see Element of "p" in Fig. 2), able to facilitate injection of holes, and a recombination type sublayer (see Element "polymer" in Fig. 2,



Art Unit: 2891

specifically the recombination zone depicted), able to facilitate recombination of the charge carriers.

s. Regarding claims 19 and 20, Heeger teaches that the device includes optical confinement and/or waveguiding layers and optical resonating structures and cavities on the first and/or second side of the channel (see Col. 2, Lines 64-67; Col. 4, Lines 35-67; Col. 7, Lines 35-62, at least).

t. Regarding claim 21, Heeger teaches that the device further comprises a substrate of a rigid material, such as glass (see "glass" in Figs. 1-2), or a flexible material, such as plastic (see Col. 8, Lines 56-58).

u. Regarding claims 22-27, the entirety of the language of these claims are directed towards the process of making the electroluminescence generating device of claim 1. It is well settled that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious

Art Unit: 2891

product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. The above case law further makes clear that applicant has the burden of showing that the method language necessarily produces a structural difference. As such, the language claims 22-27 only requires the electroluminescence generating device of claim 1, which does not distinguish the invention from Heeger, who teaches the structure as claimed.

v. Regarding claim 28, Heeger teaches a method for generating electroluminescence using the device of claim 1 by recombination of electrons and hole injected into the channel from the electron electrode and the hole electrode (Figs. 1-2 and associated text).

### ***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heeger ('583) in view of Dodabalapur ('208).

Regarding claims 10-11, Heeger teaches that amorphous materials can be used as the channel (Col. 8, Lines 17-19) and is silent regarding polycrystalline materials or that the grain

Art Unit: 2891

size of the polycrystalline material is larger than the channel length spacing between the electron electrode and hole electrode.

However, Dodabalapur teaches using polycrystalline small molecule materials are advantageous over amorphous small molecule materials for channels in organic transistors (see Col. 3, Lines 19-21 and Col. 5, Lines 56-65) and that the grain size of the polycrystalline material is preferably larger than the channel length spacing between the electron electrode and hole electrode (see Col. 5, Lines 56-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a polycrystalline material with a grain size that is larger than the channel length spacing between the electron electrode and hole electrode as taught by Dodabalapur in the device of Heeger. One would have been motivated to do so since polycrystalline materials have higher carrier mobility and improved device performance and that the grain size exceed the channel length spacing between the electron electrode and hole electrode further improves these performance characteristics of the device because the active region between the electron and hole electrodes behave effectively as a single crystal (see Dodabalapur Col. 5, Lines 56-65).

19. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heeger ('583) in view of Rogers (Appl. Phys. Lett., Vol. 75).

Heeger teaches the device of claim 1, but is silent regarding conventional details such as the separation distance between the electron and hole electrodes.

However, Rogers teaches forming an organic transistor with a separation distance between the electron and hole electrodes (source and drain) of, for example 100 nm or 0.1

Art Unit: 2891

microns (see Abstract; Page 1010, Left Col., Lines 28-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the distance between the electron and hole electrodes (source and drain) of Heeger to be small, such as the 100 nm or 0.1 microns of Rogers. One would have been motivated to do so since Rogers teaches that such small distances result in a device with low voltage and high current characteristics (see Abstract; Page 1010, Left Col., Lines 28-33; Page 1012, Right Col., Lines 25-29) making them even suitable for light emission circuitry.

20. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heeger ('583) in view of Brazis, Jr. ('120).

Heeger does not teach the specific configuration for the electron and hole electrodes being digitated structures with regular repetition of a basic finger structure with the electron and hole electrodes alternating each other with two characteristic in-plane distances P and R therebetween being equal.

However, Brazis, Jr. teaches an organic semiconductor transistor with an electron electrode (see Element 14 in Fig. 3) and a hole electrode (see Element 15 in Fig. 3) being digitated structures with regular repetition of a basic finger structure with the electron and hole electrodes alternating each other with two characteristic in-plane distances P and R therebetween being equal (see Fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the configuration set forth by Brazis, Jr. for the electron and hole electrodes of Heeger. One would have been motivated to do so since Brazis, Jr. teaches that such

Art Unit: 2891

a configuration is advantageous because such a configuration allows for wide channel widths over a small area to improve the current handling capabilities of the device (Para. 0010, 0014).

### ***Conclusion***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Koyama ('398), Christensen ('259), Tessler ('139) and Hiroshi ('380 and WO '608) each teaches a light emitting transistor with a channel as the light emission region controlled by a gate electrode in lateral configurations.

Papadimitrakopoulos ('550) teaches forming a single crystal type transistor and light emitter with a oligomeric Zn-bisquinoline chelate, which is capable of light emission.

Iechi ('952) and Baldo ('698) each teach a light emitting transistor in the static induction transistor configuration.

Avouris ('422) teaches a carbon nanotube light emitting lateral transistor configuration.

Hirai ('729) teaches conventional organic transistors and typical organic semiconductors.

Dodabalapur (Adv. Mater., Vol. 8) suggests ambipolar operation of organic transistors could be useful as a method of generating light emission (Page 854, Section 3).

### ***Contact Information***

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. SUCH whose telephone number is (571)272-8895. The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

Art Unit: 2891

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Rose can be reached on (571) 272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew W. Such/  
Examiner, Art Unit 2891